

4.—*The Fresh-water Entomostraca of Cape Province (Union of South Africa)*.—By G. O. SARS. Part I: Cladocera. With 13 plates.

(Plates XXIX–XLI.)

INTRODUCTION.

UNDER the above title I intend to give an account of all the forms of fresh-water Entomostraca from *Cape Colony*, which have as yet come under my notice, with short descriptions and easily recognisable figures of each species. The present part only deals with the *Cladocera*; in two or three succeeding parts the *Ostracoda* and *Copepoda* will be treated of in a similar manner.

In the General Catalogue of South African Crustacea published by the Rev. T. R. R. Stebbing in the present Annals, vol. vi, nineteen species of Cladocera are enumerated. Nine of these had been described by the present author in a previous paper* from specimens raised out of dried mud from Knysna, and in another paper† two other species belonging to the Fauna of Sumatra were also stated to occur in Cape Colony. The remaining eight species have been recorded chiefly by Prof. Brady from the neighbourhood of Natal. In the present paper more than twice as many species, viz. forty-three, will be described as belonging to the Fauna of Cape Colony, eleven of which are apparently new to science.

The greater number of the forms here treated of have been reared from dried mud in my aquaria, and have been domesticated for several years and in numerous successive generations. I have thereby been enabled to subject the said species to a very thorough investigation, and at the same time to give good and characteristic figures of them, representing the animals as they appear in the fresh and living state. The great advantage attained by this method for the study of exotic fresh-water Entomostraca will be easily appreciated. For thereby not only will, as a rule, a sufficient number of specimens of each species be obtained for examination and comparison, but this method permits the study of the biological relations of the species, their growth, movements, propagation, and seasonal variation. Especially as regards the *Cladocera*, the

* On some South African Entomostraca raised from dried mud. Chr. Vid. Selsk. Skrifter f. 1895.

† Fresh-water Entomostraca from China and Sumatra. Arch. f. Mathem. u. Naturv. 1903.

said method has proved to be of invaluable service, as these very delicate organisms scarcely admit of being satisfactorily examined except in the fresh and living condition. By immersion in alcohol or any other preserving fluid, they very soon not only lose much of their beauty and transparency, but in many cases even become more or less deformed by the contraction of the softer parts and the inconvenient twisting of the natatory antennae and the caudal part, so as to be less serviceable for an exact examination. The imperfectness of the habitus-figures generally given of exotic Cladocera is indeed in most cases due to the above-mentioned injurious action of the preserving fluid on the specimens examined.

The mud which has been placed at my disposal was taken from four different localities in Cape Colony, viz.:

(1) *Knysna*. Four parcels collected by Mr. Theson from a swamp in 1890 and 1891.

(2) *Port Elizabeth*. Three parcels kindly forwarded to me in 1897, 1899 and 1900 by Mr. Hodgson, and collected by his brother from a "vley" near that town.

(3) *Green Point Common*. Several small parcels kindly sent to me in 1898 and 1899 by Dr. Purcell.

(4) *Cape Flats and neighbourhood of Bergvliet, Cape Town*. A large quantity of mud from four different localities kindly sent to me by Dr. Purcell in 1909.

Moreover, I have received from the South African Museum, through the kind intervention of Dr. Purcell, a number of alcoholic samples taken from different localities in the neighbourhood of Cape Town.

It will be seen from the above communication that a very extensive material for the study of the fresh-water Entomostraca of the Cape Colony has been placed at my disposal, and I venture, therefore, to believe that the present account will be rather a complete one, comprising in reality the great majority of the species which are to be found in that region.

The *Cladocera* of Cape Colony belong to the three following families: *Daphniidae*, *Macrothricidae* and *Chydoridae*; the *Sididae*, *Bosminidae* and *Polyphemidae* not being represented.

FAM. DAPHNIIDAE.

GEN. 1. DAPHNIA, O. Fr. Müller.

Remarks.—In his Revision of the Cladocera Dr. J. Richard has divided this genus into two groups, according to the presence or absence

of secondary denticles on the caudal claws. All the species treated of in the present paper belong to the first of these groups with denticulated caudal claws. This group again is divided by Dr. Richard into two subdivisions, according to the form of the cephalic fornix, which in the one subdivision is rather prominent, terminating behind on each side in a well-marked sharp corner, whereas in the second subdivision it is quite simple, without any projecting corner behind. Both these subdivisions are represented in the Fauna of Cape Colony, the first five species described below belonging to the former subdivision, the other two species to the latter. In my opinion the form of the cephalic fornix is of more essential significance than the armature of the caudal claws, and accordingly I should prefer to base the primary division upon this character, and to use the armature of the caudal claws in the second place for distinguishing two subdivisions of the one primary group.

1. DAPHNIA MAGNA, Straus.

(Plate XXIX, figs. 1, 1 a, b.)

Daphnia magna, Straus. Mém. Mus. d'Hist. Nat. vol. vi, 1820, p. 159, pl. 29, figs. 21 and 22.

Syn.: *Daphnia Schaefferi*, Baird.

Specific Characters—Female.—Valvular part of shell (carapace), seen laterally, broadly oval in outline, with the spine originating far above the axis of the body and more or less strongly upturned; denticles of dorsal edge extending about to the cervical region. Cephalic part of shell (head) of moderate size and rather procumbent, exhibiting on each side a well-marked arched keel running parallel to the dorsal edge, and in some cases accompanied by another imperfectly developed keel; fornix strongly prominent and terminating behind in a sharp corner; dorsal margin of head evenly curved and joining the almost straight ventral margin by an abrupt bend; rostrum slightly prominent, though obtuse at the tip. Eye of moderate size. Antennulae small, but well defined and conical in form. Tail-piece rather produced and considerably attenuated distally; posterior or dorsal edge deeply sinuated beyond the middle, dividing the anal denticles into two sets; apical claws rather slender and evenly curved, with the secondary denticles very delicate and densely crowded.

Remarks.—The above-characterised form is unquestionably identical with the well-known European species, *D. magna*, though the South African specimens differ a little from the typical ones in the form of the head and in the more strongly upturned shell-spine. The largest of the specimens examined had a length (without the shell-

spine) of 4.2 mm., whereas the European form may grow to a length of 5.3 mm.

Occurrence.—Numerous specimens of this form were contained in a sample taken by Dr. Purcell in September, 1896, from a dam at Touws River Station, Worcester Div. The species has recently been successfully reared in my aquaria from mud taken by Mr. Orjan Olsen from a pond near the Whaling Station at Saldanha Bay.

Distribution.—Throughout Europe, Turkestan, Palestine, Central Asia, Algeria, Tunis, Greenland.

2. DAPHNIA DOLICHOCEPHALA, G. O. Sars.

(Plate XXIX, figs. 2, 2 a, b.)

Daphnia dolichocephala, G. O. Sars. On some South African Eutostraca raised from dried mud. Chr. Vid. Selsk. Skrifter f. 1895, p. 4, pl. 1.

Specific Characters—Female.—Carapace, seen laterally, oblong oval in outline, and gradually contracted behind, with the spine of variable length and originating nearly in the axis of the body, though slightly upturned; denticles of dorsal edge extending (at least in ephippial specimens) beyond the cervical region. Head comparatively large, with the occipital part more or less bulging above, front sub-angular below; inferior edge quite straight; rostrum short and obtuse, slightly scabrous in front. Eyes well developed and occurring just within the frontal angle. Antennulæ small, knob-like, and originating from a broad fleshy protuberance immediately behind the rostrum. Tail-piece comparatively short and conical in form, with the hind edge quite straight, and denticles small, ten to twelve on each side, and not extending to the middle of the piece; apical claws short and thick, with the secondary denticles well marked. Intestinal tube forming a bold curve within the occipital part of the head.

Body pellucid, with a greenish tinge.

Length of shell (without the spine) reaching 3 mm.

Remarks.—This form was described by the present author as early as the year 1895 from specimens reared out of mud taken at Kynsna, and its specific distinctness had been admitted by all subsequent authors, though in some respects it exhibits a certain resemblance to *D. atkinsoni*, Baird.

Occurrence.—I have reared this form from the Kynsna mud and also from mud taken in another locality, viz. at Green Point Common, near Cape Town, and the same species was moreover contained in two alco-

holio samples kindly sent to me by Dr. Purcell, the one taken at Green Point Common, the other at Salt River, October 22nd, 1898.

The present species has not yet been recorded from other parts of the world.

3. *DAPHNIA HODGSONI*, n. sp.

(Plate XXIX, figs. 3, 3 a, b.)

Specific Characters—Female.—Carapace, seen laterally, rounded oval in outline, with the spine generally very long and obliquely turned upwards, issuing somewhat above the axis of the body; denticles of dorsal edge extending beyond the cervical region and in ehippial specimens of quite an unusual length, almost setiform. Head of moderate size and defined from the carapace above by a slight concavity of the dorsal margin; occipital part more or less produced in a hood-like manner, front scarcely angular below, the anterior and inferior edges being in some cases even quite continuous; rostrum, as in *D. dolichocephala*, short and obtuse, with a rather conspicuous scabrosity in front. Eye very large, with numerous refracting bodies. Antennulae about as in *D. dolichocephala*. Tail-piece, however, differing conspicuously both in form and armature, being comparatively larger, with the posterior edge angularly produced in the middle; anal denticles well developed and continued on each side of the proximal part by a well-marked lateral series almost extending to the base of the piece; apical claws comparatively larger than in *D. dolichocephala*.

Body highly pellucid, with a faint yellowish or greenish tinge.

Length of shell (without the spine) reaching 2.5 mm.

Remarks.—This form is allied to *D. dolichocephala*, but differs conspicuously in the shape of the head, and more particularly in the form and armature of the tail-piece. It is named in honour of Mr. Hodgson, to whom I am indebted for discovering this handsome species.

Occurrence.—Numerous specimens of this form developed in some of my aquaria prepared with mud from Port Elizabeth, and were watched for several successive generations. The female specimen figured on the plate belonged to the earlier generations. Later in the season the size of the specimens somewhat diminished, and at the same time the form of the head was slightly changed, the occipital part being less prominent. In ehippial females the carapace assumed a broadly rounded form, with the ehippium generally of a very dark colour and edged dorsally with unusually long, almost setiform denticles. The male of this species exhibits a very similar appearance to that of *D. dolichocephala*, as described in my former paper.

4. DAPHNIA CORONATA, n. sp.

(Plate XXX, fig. 1, 1a-f.)

Specific Characters—Female.—Carapace, seen laterally, oval in outline, with the spine rather coarse and turned obliquely upwards, originating considerably above the axis of the body. Head comparatively large, with the occipital part produced above to a hump-like protuberance, front rounded below, inferior edge straight; rostrum short and obtuse, resembling that in the two preceding species. Dorsal denticles of carapace rather coarse and arranged in a double series extending far in front, and on the occipital part of the head diverging to encircle a somewhat lozenge-shaped area just behind the hump-like protuberance. Eye of moderate size. Antennulae small, resembling in structure those in the two preceding species. Tail-piece exhibiting a similar form to that in *D. dolichocephala*, but having the apical claws comparatively larger and the anal denticles more coarsely developed.

Length of shell (without the spine) reaching 2 mm.

Remarks.—The above-described form is closely allied to *D. dolichocephala*, and indeed at first I was inclined to regard it as merely a variety of that species. On a closer examination, however, I have found that it ought to be distinguished specifically, as it differs very conspicuously in the shape of the head and more particularly in the peculiar ornamentation of the occipital part, which latter character has suggested the specific name here proposed. A somewhat similar ornamentation is also found in the form at first recorded by Dr. Richard under the name *D. bolivari*, but subsequently considered by that author to be a variety of *D. atkinsoni*, Baird, as also in the peculiar form described by the present author from the Central Asiatic lake Tennice as *D. triquetra*. The present form is, however, otherwise very different from either of these two species.

Occurrence.—Numerous specimens of this *Daphnia* (most of them still immature) were contained in an alcoholic sample kindly sent to me by Dr. Purcell, who procured it from a pond in the Karroo at Ashton, Robertson Division, August 26th, 1900. All the female specimens exhibited the same characteristic shape of the head and the same peculiar ornament of its occipital part. In the male, however, of which only a single specimen was found, this ornament was wholly wanting, as seen from the fig. 1f on the accompanying plate.

5. DAPHNIA THOMSONI, G. O. Sars.

(Plate XXX, figs. 2, 2 a-c.)

Daphnia thomsoni, G. O. Sars. Contributions to the knowledge of the Fresh-water Entomostraca of New Zealand. Chr. Vid. Selsk. Skrifter f. 1894, p. 5, pl. i.

Syn.: *Daphnia similis* Thomson (not Claus).

Specific Characters—Female.—Carapace, seen laterally, broadly oval in outline, with the spine rather thin and obliquely upturned, originating somewhat above the axis of the body. Head comparatively large and distinctly carinated throughout, being defined above from the carapace by a slight concavity of the dorsal margin, frontal part evenly rounded off, inferior edge straight and produced behind to a rather prominent acuminate rostrum. Dorsal denticles of carapace not extending beyond the cervical region. Eye of moderate size. Antennulæ extremely small, scarcely projecting beyond the hind edge of the head except with the apical papillæ. Tail-piece rather produced and tapering distally, with the hind edge somewhat flexuous, exhibiting below the anal fissure a slight sinus; anal denticles well developed, twelve to fourteen in number on each side; apical claws slender and evenly curved, with the secondary denticles well marked.

Body highly pellucid, with a faint yellowish or pale reddish tinge.

Length of shell (without the spine) reaching 3·7 mm.

Remarks.—This form was first recorded by Prof. Thomson from New Zealand under the name of *D. similis*; but as that name had been previously given by Claus to another species, it was changed by the present author to *D. thomsoni*. Its nearest ally is unquestionably the Australian species *D. carinata*, King, and not, as believed by Dr. Richard, *D. similis*, Claus. From the numerous varieties of the former species it is easily distinguished by the rather different shape of the tail-piece, which somewhat resembles that in *D. magna*.

Occurrence.—The present species, which has been fully described and figured in my paper on the New Zealand Entomostraca, was also reared in the year 1895 from the Knysna mud, and some specimens of the earlier generations were at that time secured and preserved for further examination and comparison. The figures given on the accompanying plate have been drawn from one of these specimens.

Distribution.—New Zealand.

6. DAPHNIA PROPINQUA, G. O. Sars.

(Plate XXXI, figs. 1, 1 a, b.)

Daphnia propinqua, G. O. Sars. On some South African Ento-

mostraca raised from dried mud. Chr. Vid. Selsk. Skrifter f. 1895, p. 9, pl. 2, figs. 1-8.

Specific Characters—Female.—Carapace, seen laterally, regularly oval in outline, with the spine very short and issuing about in the axis of the body; dorsal denticles only occupying the posterior half of the carapace. Head of moderate size and slightly carinated, with the fornix quite simple, not exhibiting any projecting corner behind; dorsal edge evenly curved, front broadly rounded below, inferior edge slightly concaved; rostrum terminating in a short deflexed point. Eye unusually large. Antennulæ small, but distinctly prominent, arising from a rounded fleshy protuberance behind the rostrum. Tail-piece slightly tapering distally and narrowly truncated at the end, with the hind edge a little bulging in the middle; anal denticles about twelve on each side, and extending to the middle of the piece; apical claws of moderate size and having the secondary denticles well marked.

Body highly pellucid, with a faint greenish-blue tinge.

Length of shell reaching 1.8 mm.

Remarks.—This form, like the following one, belongs to the group of *Daphnia* generally termed the "*pulex* group," which agrees with the preceding species in the armature of the caudal claws with distinct secondary denticles, but differs materially in the quite simple fornix of the head. The nearest ally of the present species seems to be *D. obtusa*, Kurz., and indeed Dr. Richard is inclined to regard it merely as a variety of that species. It differs, however, conspicuously in the form of the head and in the presence of a well-marked, though short, shell-spine, which is obsolete in *D. obtusa*, as indicated by the specific name of that species.

Occurrence.—The specimens originally described by the present author were reared from mud taken at Knysna. I have subsequently had an opportunity of examining some additional specimens of the same form found in an alcoholic sample kindly sent to me from the South African Museum and procured by Dr. Purcell, April, 1896, from a small duck-pond at Salt River, near Cape Town. These specimens exactly agreed with those raised from the Knysna mud.

The present species has not as yet been recorded from other parts of the world.

7. *DAPHNIA TENUISPINA*, n. sp.

(Plate XXXI, figs. 2, 2 a, b.)

Specific Characters—Female.—Shell very thin and transparent, with the carapace, seen laterally, oval in outline and not defined from the head by any obvious concavity of the dorsal margin, spine very thin and fragile, issuing in the axis of the body and not at all upturned, in

some cases even prominently deflexed; denticles of the dorsal edge very small and only visible in the posterior part of the carapace. Head comparatively smaller than in *D. propinqua*, with the front less prominent and narrowly rounded below; rostrum well marked and somewhat less deflexed than in the said species. Eye of comparatively smaller size. Antennulae about as in that species. Tail-piece somewhat less produced and having the hind edge straight; anal denticles about ten on each side and scarcely extending to the middle of the piece; apical claws resembling in structure those in *D. propinqua*.

Length of shell reaching 1.8 mm.

Remarks.—In its general appearance this form is not unlike some of the many varieties of *D. longispina*, and could, therefore, easily at first sight be assigned to that species. A closer examination of the tail-piece, however, shows it in reality to belong to quite a different group of *Daphniae*, viz., to the "*D. pulex* group." From the preceding species, which belongs to the same group, it is easily distinguishable by the different shape of the head and by the very thin and fragile shell-spine, which latter character has suggested the specific name here proposed.

Occurrence.—Numerous specimens of this form were contained in an alcoholic sample kindly sent to me by Dr. Purcell, who procured it, May, 1896, from a brick-pond at Bergvliet. The present species was not raised in my aquaria.

GEN. 2. SIMOSA, Norman.

Syn.: *Simocephalus*, Schoedeler.

Remarks.—As the name *Simocephalus*, given to this genus by Schoedeler and in general use by subsequent authors, has proved to be preoccupied, the above change of name was proposed in the year 1903 by Canon A. M. Norman. The genus originally comprised three well-defined European species, viz., *S. exspinosa* (de Geer), *S. retula* (Müller), and *S. serrulata* (Koch). To these there have been added in recent times several other species from different parts of the world; but some of them exhibit such a close relationship to the one or the other of the three said European species, that their specific validity appears somewhat questionable. This may indeed apply to the three South African species described below.

8. SIMOSA AUSTRALIENSIS (Dana).

(Plate XXXI, figs. 3, 3 a, b.)

Daphnia australiensis, Dana. United States Exploring Expedition. Crustacea II, 1853, p. 1271, pl. 89, figs. 4 a-e.

Simocephalus australiensis, G. O. Sars. Additional Notes on Australian Cladocera. Chr. Vid. Selsk. Forhandl. f. 1888, p. 15, pl. 2, figs. 1-5.

Specific Characters—Female.—Carapace, seen laterally, obliquely oval or sub-rhomboid in outline, being only slightly expanded behind, dorsal margin almost straight in the greater part of its extent, but forming behind an abrupt curve before joining the well-marked posterior protuberance of the shell; the latter, as also the adjoining part of the dorsal edge strongly denticulated; posterior edges of valves somewhat flexuous and very oblique, joining the inferior ones without any intervening angle. Head comparatively small, though, as usual, having the fornix greatly expanded, front sub-angular below, rostral projection abruptly deflexed, and defined from the straight inferior edge of the head by an angular notch. Ocellus small, rhomboid in form. Tail-piece rather broad in its proximal part, with the supra-anal angle obtuse; anal denticles ten to twelve on each side and rapidly increasing in length distally; apical claws slender and nearly straight, with a number of distinct denticles at the base.

Colour more or less dark ochraceous.

Length of shell reaching 2·8 mm.

Remarks.—This form was rather imperfectly characterised and figured by Dana under the name of *Daphnia australiensis*, and was subsequently more fully described by the present author from specimens raised out of dried Australian mud. It is closely allied to the European species, *P. exspinosa* (de Geer), from which indeed it only differs in the somewhat unlike shape of the posterior part of the shell in adult female specimens.

Occurrence.—I have reared this form in considerable numbers from three different parcels of mud kindly sent to me by Dr. Purcell. The parcels were taken partly from pools in the Cape Flats, partly from swamps in the neighbourhood of Bergvliet. It was also reared from the Knysna mud.

Distribution.—Australia.

9. SIMOSA VETULOIDES (G. O. Sars).

(Plate XXXII, figs. 1, 1 a, b).

Simocephalus vetuloides, G. O. Sars. The Cladocera, Copepoda, and Ostracoda of the Jana Expedition. Annuaire du Musée Zool. de l'Acad. Imp. de St. Petersburg, 1898, p. 5, pl. vi, figs. 11 and 12.

Specific Characters—Female.—Carapace, seen laterally, rounded trigonal in outline, being considerably expanded behind and terminating

in a short, obtuse protuberance located about in the axis of the body; dorsal margin strongly curved in its posterior part; hind edges of valves nearly straight and rather oblique, joining the inferior ones at a well-marked angle. Posterior part of dorsal margin strongly denticulated, the denticles being also continued on the terminal protuberance of the shell. Head somewhat more prominent than in the preceding species, with the front narrowly rounded below; rostral projection very small, and not defined in front by any notch. Ocellus forming a narrow stripe obliquely ascending from the base of the rostrum. Tail-piece resembling in shape that in the preceding species, though having the supra-anal angle somewhat more prominent; anal denticles 8-10 on each side; apical claws without any secondary denticles at the base.

Colour light yellow.

Length of shell reaching 2.2 mm.

Remarks.—The above-characterised form agrees fairly well with the species described in 1897 by the present author from specimens collected during the Russian Jana Expedition. As indicated by the specific name, it is nearly allied to the European species, *S. vetula* (Müller), differing, however, conspicuously in the shape of the carapace, the hind part of which exhibits a well-marked median protuberance, wholly wanting in *S. vetula*.

Occurrence.—Several specimens of this form were reared from one of the parcels of mud kindly sent to me by Dr. Purcell and taken from old gravel-pits at Bergvliet. The same form was also found in some of the alcoholic samples forwarded to me from the South African Museum and procured by Dr. Purcell in 1896 from ponds in the Cape Flats.

Distribution.—Siberia, Central Asia.

10. SIMOSA CAPENSIS (G. O. Sars).

(Plate XXXII, figs. 2, 2 a, b).

Simocephalus capensis, G. O. Sars. On some South African Entomostraca raised from dried mud. Chr. Vid. Selsk. Skrifter, 1895, p. 15, pl. 3.

Specific Characters—Female.—Carapace, seen laterally, broadly oval or somewhat rhomboid in outline, with a well-marked protuberance behind in the middle, dorsal margin evenly curved and slightly sinuated just above the said protuberance; hind edges of valves oblique and joining the inferior ones at an obtuse angle. Posterior part of dorsal margin denticulate, the denticles being continued on

the terminal protuberance, but not on the hind edges of the valves. Head comparatively small and somewhat prominent, with the dorsal margin evenly curved, front forming below an acute angle clothed anteriorly with a number of minute denticles; rostral projection extremely small. Eye comparatively large, with the refractive bodies very conspicuous; ocellus small, rhomboid in form. Tail-piece comparatively less broad than in the two preceding species, with the supranal angle rather produced; anal denticles about eight on each side; apical claws without secondary denticles at the base, but finely ciliated along the concave edge.

Colour light ochraceous, with a tinge of chestnut.

Length of shell reaching 2.4 mm.

Remarks.—This form, described by the present author in 1895, is allied to the European species *S. serrulata* (Koch), but differs somewhat in the shape of the head and in the armature of the hind part of the shell; the denticles being not, as in *S. serrulata*, continued on the posterior edges of the valves.

Occurrence.—This form was reared by the present author from mud taken at Knysna. It has also been recorded by Prof. Brady from Richmond, Natal. In other parts of the world it has not yet been observed.

GEN. 3. SCAPHOLEBERIS, Schoedeler.

Remarks.—Of this characteristic genus at least four well-defined species are known from the northern hemisphere. To the fauna of Cape Colony belongs another species, to be described below.

II. SCAPHOLEBERIS KINGI, G. O. Sars.

(Plate XXXII, figs. 3, 3*a*, *b*).

Scapholeberis kingi, G. O. Sars. Fresh-water Eutomostraca from China and Sumatra. Arch. f. Mathem. u. Naturv., 1903, p. 8, pl. 1, figs. 2, 2*a-c*.

Syn.: *Daphnia mucronata*, King (not Müller).

Specific Characters—Female.—Carapace rather tumid, seen laterally, oval quadrangular in outline, being transversely truncated behind, with the inferior corner of each valve produced to a comparatively short spiniform process pointing backwards, inferior edges of valves straight and slightly angular in front. Head less prominent than in the type species, with the frontal part unarmed and narrowly rounded, inferior edge deeply concave, rostrum short and blunt. Shell sculptured with distinct transverse striae, particularly strong and ridge-like in the

posterior part; inferior edges of valves densely ciliated, eye comparatively large; ocellus small, located close to the rostrum. Tail-piece short and obliquely truncated at the end; anal denticles only four or five on each side; apical claws short and stout.

Colour dark brown, with still darker, almost blackish, shadows.

Length of shell scarcely exceeding 0·8 mm.

Remarks.—This form was observed as early as the year 1852 by King in the neighbourhood of Sydney, but was erroneously identified with *S. mucronata* (Müller), from which it differs in its much smaller size, as also in the different shape of the head and the comparatively small size of the processes issuing from the infero-posterior corners of the valves.

Occurrence.—Some specimens of this form were reared from one of the parcels of mud kindly sent to me in 1909 by Dr. Purcell. The mud was taken from an old brick-pond at Bergvliet. The same species also occurred occasionally in some of the Australian samples.

Distribution.—Australia, Sumatra.

GEN. 4. CERIODAPHNIA, Schoedeler.

This genus seems to be very rich in species, and is represented in nearly all parts of the world. Nearly thirty species have been described by different authors; but it is not improbable that some of them must be withdrawn as insufficiently characterised. To the fauna of Cape Colony belong six species, to be described in the following pages.

12. CERIODAPHNIA PRODUCTA, n. sp.

(Plate XXXIII, figs. 1, 1 *a*, *b*.)

Specific Characters—Female.—Carapace, seen laterally, rounded in outline, with a very large and conspicuous conical protuberance behind, issuing nearly in the axis of the body. Head, as usual, sharply marked off from the carapace, and somewhat less procumbent than in the other species; frontal part rather produced and narrowly rounded, without any rostral angle behind. Reticulation of shell very close, but not very conspicuous; free edges of valves minutely denticulate, the denticles being also continued on the dorsal margin. Eye large, almost filling up the frontal part; ocellus very small. Antennulae comparatively short. Tail-piece of normal shape, tapering slightly towards the end; anal denticles eight on each side; apical claws each with five secondary denticles in their proximal part.

Colour not yet ascertained.

Length of shell reaching 1·5 mm.

Remarks.—This form is allied to the European species *C. reticulata* (Jurine); but is of larger size, and, moreover, distinguished by the very large protuberance issuing from the shell behind, a character which indeed has given rise to the specific name here proposed.

Occurrence.—Several specimens of this form were found in an alcoholic sample kindly sent to me by Dr. Purcell, and taken in 1896 from a pond in the Cape Flats. This species has not been reared in my aquaria.

13. CERIODAPHNIA RETICULATA (Jurine), var. *minor*, n.

(Plate XXXIII, figs. 2, 2 a, b.)

Monoculus reticulatus, Jurine. Histoire des Monocles, etc. 1820 p. 139, pl. 14, figs. 3 and 4.

Specific Characters—Female.—Carapace, seen laterally, rounded oval in outline, with the posterior protuberance rather slight and issuing far above the axis of the body. Head less erect than in the preceding species, with the frontal part slightly angular behind. Reticulation of shell not very sharply marked, and not so close as in that species; free edges of valves perfectly smooth. Eye of moderate size. Antennulae resembling in structure those in *C. producta*. Tail-piece with the posterior edge slightly sinuate beyond the middle; anal denticles eight on each side, the outermost ones somewhat smaller than those in the middle; apical claws each with six well-marked denticles at some distance from the base.

Body pellucid, with a faint yellow tinge.

Length of shell reaching 0·9 mm.

Remarks.—The above-characterised form agrees in all essential structural details so closely with a small variety of *C. reticulata* occurring rather commonly in Norway and other countries of Europe, that I have found it impossible to distinguish it specifically. I am also now inclined to believe that the two forms previously described by me as *C. sublaevis* and *C. richardi* should more properly be assigned to the same species.

Occurrence.—This form was reared in great abundance from a parcel of mud taken by Dr. Purcell from a small pool in the Cape Flats. It was also present in an alcoholic sample procured by that gentleman from the same region, and kindly sent me for examination.

Distribution.—Throughout Europe, central part of Asia, New Zealand, North and South America.

14. CERIODAPHNIA QUADRANGULA (MÜLLER), var.

(Plate XXXIII, figs. 3, 3a, b.)

Daphnia quadrangula, O. Fr. Müller. Entomostraca, 1785, p. 90, pl. xiii, figs. 3 and 4.

Specific Characters—Female.—Carapace, seen laterally, rounded quadrangular in outline, with the posterior protuberance distinctly produced and issuing far above the axis of the body. Head rather procumbent, with the frontal part evenly rounded off, without any angle behind. Reticulation of shell coarser than in the two preceding species; free edges of valves minutely denticulate, the denticles being also continued on the hind part of the dorsal margin. Eye of moderate size. Antennulae somewhat more produced than in the two preceding species. Tail-piece comparatively short and stout, with the posterior edge scarcely sinuated; anal denticles of uniform size, and about eight on each side; apical claws perfectly smooth.

Body somewhat less pellucid than in *C. reticulata*, with a yellowish-grey tinge.

Length of shell reaching 0·9 mm.

Remarks.—This form also I have been induced to identify with a well-known European species, viz., *C. quadrangulata* (Müller), though it differs somewhat from typical specimens of that species in the coarser reticulation of the shell and the distinctly denticulate edges of the valves. Otherwise I have, however, failed to detect any reliable difference to distinguish it specifically.

Occurrence.—Some specimens of this form were reared in one of my aquaria prepared with mud from the Cape Flats kindly sent to me by Dr. Purcell.

Distribution.—Throughout Europe, Central Asia, Greenland.

15. CERIODAPHNIA DUBIA, Richard.

(Plate XXXIV, figs. 1, 1a, b.)

Ceriodaphnia dubia, Richard. Entomostracés recueillis dans le lac Joba, Sunatra. Ann Mus. Gen. xxxiv, 1895, p. 570, text-figs. 6–8.

Specific Characters—Female.—Carapace, seen laterally, oval in outline, with the posterior protuberance rather short and issuing somewhat above the axis of the body. Head less procumbent than in *C. quadrangula*, with the frontal part narrowly rounded and distinctly angular behind. Shell very thin, with the reticulation rather faintly marked; edges of valves smooth. Eye comparatively large. Antennulae about as in *C. reticulata*. Tail-piece with the posterior edge

quite straight, anal denticles about ten on each side, the outermost one smaller than the others; apical claws without any secondary denticles.

Body highly pellucid, with a faint greenish tinge.

Length of shell reaching 0·7 mm.

Remarks.—The present species, established by Dr. Richard, has a general resemblance to the above-described variety of *C. reticulata*, and may, at first sight, easily be confounded with it. On a closer examination, however, it admits of being clearly distinguished by the absolute absence of secondary denticles on the caudal claws.

Occurrence.—This form developed in great abundance in some of my aquaria prepared with mud received from Dr. Purcell in the year 1909. The mud was taken from different localities in the neighbourhood of Bergvliet.

Distribution.—Sumatra, New Zealand, Australia.

16. CERIODAPHNIA LATICAUDATA, P. E. Müller.

(Plate XXXIV, figs. 2, 2 a, b.)

Ceriodaphnia laticaudata, P. E. Müller. Danmarks Cladocerer, 1867, p. 130, pl. I, fig. 19.

Syn.: *Daphnia reticulata*, Baird (not Jurine).

„ *Ceriodaphnia quadrangula*, G. O. Sars (not Müller).

Specific Characters—*Female*.—Carapace, seen laterally, rounded quadrangular in outline, with the posterior protuberance not very prominent and occasionally considerably above the axis of the body. Head comparatively small and rather procumbent; frontal part narrowly rounded, with only a slight trace of angle behind. Reticulation of shell very conspicuous, edges of valves smooth. Eye of moderate size. Antennulae somewhat produced, though resembling in structure those in the preceding species. Tail-piece unusually large and expanded, almost securiform in shape, the posterior edge forming in the middle a bold curve; anal denticles ten on each side and nearly equal-sized; apical claws perfectly smooth.

Colour of shell yellowish orange, with the enclosed body of a darker red hue.

Length of shell reaching 0·75 mm.

Remarks.—I have failed to detect any essential differences between the above-characterised form and typical specimens of *C. laticaudata* taken in Norway. The species is particularly distinguished by the shape of the tail-piece, which is rather unlike that in the other species here described.

Occurrence.—Some specimens of this form developed in one of my aquaria, and at once attracted my attention by their bright red colour and comparatively slow movements. The mud with which the aquarium was prepared was derived from a small pool in the Cape Flats, and kindly sent to me by Dr. Purcell.

Distribution.—Throughout Europe, Turkestan, Madagascar, Australia.

17. CERIODAPHNIA RIGAUDI, Richard.

(Plate XXXIV, figs. 3, 3 a, b.)

Ceriodaphnia rigaudi, Richard. Sur quelques animaux inférieurs des eaux douces de Tonkin. Mém. Soc. Zool. de France, t. vii, 1894, p. 239.

Specific Characters—*Female.*—Carapace, seen laterally, more or less rounded in outline, with the posterior protuberance only slightly produced, and occurring somewhat above the axis of the body. Head rather procumbent, with the frontal part rounded anteriorly and produced below to a very conspicuous acuminate rostrum pointing obliquely downwards. Reticulation of the shell rather coarse, edges of valves smooth. Eye comparatively large, with very distinct refracting bodies. Antennulae of the usual structure, not nearly extending to the end of the rostrum. Tail-piece moderately broad and obliquely truncated at the end; anal denticles rather thin, six to eight on each side; apical claws smooth.

Body semipellucid, with a more or less distinct reddish or orange tinge. Length of shell scarcely exceeding 0.55 mm.

Remarks.—This form, first described by Dr. Richard, is the smallest of the known species, and is, moreover, at once recognisable by the acuminate beak-like projection issuing from the head below. The form described by the present author from Australia as *C. cornuta* is regarded by Dr. Richard as only a variety of the present species.

Occurrence.—Numerous specimens of this characteristic form were reared by me in the year 1895 from the Knysna mud. It also occurred in an alcoholic sample taken by Dr. Purcell from a dam at Faure, near Cape Town, and kindly sent to me for examination.

Distribution.—Tonkin, Palestine, Sumatra, Ceylon, New Guinea, Australia.

GEN. 5. MOINA, Baird.

Remarks.—By the rather fully developed and mobile antennulae, this genus exhibits a certain approach to the next family, the *Macrothricidae*; but the structure of the legs is very different, and on the

whole built on the same type as in the *Daphniidae*, to which family it accordingly ought to be referred. It comprises several species, four of which belong to the fauna of Cape Colony.

18. *MOINA MACROCOPA* (Straus).

(Plate XXXV, figs. 1, 1*a*.)

Daphnia macrocopa, Straus-Durkheim. Mémoire sur les Daphnia. Mém. Mus. Hist. Nat., vol. v, 1819.

Syn.: *Moina paradoxa*, Weissman.

Specific Characters—*Female*.—Carapace of somewhat varying form, according to the more or less great distension of the incubatory cavity, which in some cases causes the dorsal part to be almost globular in shape; valvular part of carapace comparatively small and forming behind, at the junction with the dorsal part, an obtuse protuberance. Head somewhat erect, with the dorsal margin quite evenly curved, without any supra-ocular depression; frontal part rounded off, lower edge of head only very slightly convex at the insertion of the antennulae. Eye of moderate size. Antennulae not much produced and narrowly fusiform in shape. Tail-piece with the distal tapering part comparatively short, not nearly half as long as the proximal part; anal denticles nine on each side, the outermost one, as usual, bidentate, the others very delicate, lancet-shaped, and finely ciliated; apical claws comparatively short and without any distinct secondary denticles. Ehippium with two egg-ampullae.

Body semipellucid, with a yellow or orange tinge.

Length of shell reaching 1.4 mm.

Remarks.—The above-characterised form, which I believe is that originally recorded by Straus-Durkheim as *Daphnia macrocopa*, may be easily recognised by the quite evenly rounded contour of the head, the comparatively short fusiform antennulae, and the shape and armature of the tail-piece. The form recorded by Mr. Gurney from Kroonstadt as *M. bella* is scarcely different from the present species.

Occurrence.—Several specimens of this form were reared in my aquaria prepared with mud partly from Port Elizabeth, partly from Green Point Common.

Distribution.—Europe, central part of Asia, Japan, North America.

19. *MOINA TENUICORNIS*, G. O. Sars.

(Plate XXXV, figs. 2, 2*a-c*.)

Moina tenuicornis, G. O. Sars. Fresh-water Entomostraca from the neighbourhood of Sydney. Arch. f. Math. u. Naturv. 1896, p. 24, pl. 4.

Specific Characters—Female.—Carapace about as in the preceding species. Head, however, considerably more procumbent, with the dorsal margin evenly curved throughout, front obtusely rounded, lower edge strongly protuberant at the insertion of the antennulae. Eye comparatively larger than in *M. macrocopa*. Antennulae very slender and narrow, almost linear in form. Tail-piece with the distal part more produced than in the preceding species, being fully half as long as the proximal one; anal denticles eleven on each side; apical claws each with a series of well-marked secondary denticles at the base. Ehippium, as in *M. macrocopa*, with two egg-ampullae.

Body rather pellucid, with a very faint yellowish tinge.

Length of shell reaching 1.5 mm.

Remarks.—This species, established in the year 1896 by the present author, is allied to *M. macrocopa* but easily distinguishable by the different shape of the head, the slender and narrow antennulae, and the more produced tail-piece, the apical claws of which have each a well-marked row of denticles at the base.

Occurrence.—Some specimens of this form developed in one of my aquaria prepared with mud taken by Dr. Purcell in the neighbourhood of Bergvliet.

Distribution.—Australia, near Sydney.

20. MOINA BRACHIATA (Jurine).

(Plate XXXV, figs. 3, 3 a, b.)

Monoculus brachiatus, Jurine. Histoire des Monocles, 1820, p. 131, pl. xii, figs. 3 and 4.

Syn.: *Moina rectirostris*, Leydig.

Specific Characters—Female.—Carapace rather large and broad, being in gravid specimens greatly distended dorsally. Head slightly procumbent, with a well-marked sinus above the ocular region, the latter narrowly rounded, lower edge of head only slightly convex at the insertion of the antennulae. Eye of moderate size. Antennulae about as in *M. macrocopa*. Tail-piece conically tapered, with the distal part more than half as long as the proximal one; anal denticles about thirteen on each side; apical claws each with a series of well-marked secondary denticles at the base. Ehippium with only a single egg-ampulla.

Colour whitish grey, with a slight yellow or violaceous tinge.

Length of shell reaching 1.3 mm.

Remarks.—The present species has generally been recorded by recent authors under the name *M. rectirostris*; but in my opinion this

name cannot properly be supported, as it not only is a very inappropriate one, but, moreover, depends on an erroneous identification of this form with Müller's *Daphnia rectirostris*, which in reality belongs to a very different genus (*Lathomura*). It is here recorded under the name assigned to this species by some of the earlier authors, and indeed I am of opinion that it in reality is identical with Jurine's *Monoculus brachiatus*. From the two preceding species it may easily be distinguished by the rather different shape of the head.

Occurrence.—I have reared this form both from the mud taken at Port Elizabeth and from that derived from Green Point Common. The same species I have recently reared in great abundance from some parcels of mud taken by Mr. Orjan Olsen from water-holes in the neighbourhood of the whaling station in Saldanha Bay. It also occurred in an alcoholic sample taken by Dr. Purcell from pools near the Salt River and kindly sent to me for examination.

Distribution.—Throughout Europe, Central Asia, North America.

21. MOINA DUBIA, Richard.

(Plate XXXV, figs. 4, 4 a, b.)

Moina dubia, Richard. Cladocères et Copépodes d'eau douce des environs de Rufisque. Mém. Soc. Zool. de France, 1892, p. 527.

Specific Characters—Female.—Carapace comparatively small and never so strongly distended dorsally as in the three preceding species. Head rather large in proportion to the carapace, with a very distinct supra-ocular sinus; front somewhat prominent and narrowly rounded, lower edge of head strongly convex at the insertion of the antennulae, with a notch-like sinus behind. Eye comparatively large, with the refracting bodies very conspicuous. Antennulae of moderate size and densely ciliated behind. Tail-piece with the distal part scarcely more than half the length of the proximal one; anal denticles only seven on each side; apical claws without any secondary denticles, but finely ciliated along the concave edge. Ephippium with only a single egg-ampulla.

Body highly pellucid and nearly colourless.

Length of shell scarcely exceeding 1 mm.

Remarks.—This species, established by Dr. Richard, is nearly allied to *M. brachiata*, but of much smaller size and more delicate structure, differing, moreover, conspicuously in the shape of the head and in the armature of the tail-piece.

Occurrence.—I have reared this form in great abundance from the mud kindly forwarded to me in 1909 by Dr. Purcell, and taken near

Bergvliet. Of this mud a great quantity is still in my possession, and, though it has now remained dry for nearly seven years, I can still obtain from it plenty of specimens. The same species also occurred in an alcoholic sample taken by Dr. Purcell from a dam at Faure.

Distribution.—Senegal, central part of Africa, Australia.

FAM. MACROTHRICIDAE.

GEN. 6. ECHINISCA, Lièvin.

Remarks.—This genus was established in the year 1848 by Lièvin, to comprise a *Macrothricid*, which he erroneously identified with *Monoculus roseus*, Jurine. The genus was not admitted by subsequent authors, but was regarded as merely a synonym of the genus *Macrothrix* of Baird, and the form originally described by Lièvin has since by most authors been recorded under the name of *Macrothrix rosea* (Jurine), though it in reality does not at all agree with the figure given by that author. I have had an opportunity of examining the true Jurinian species, of which specimens have been raised from mud taken in Algeria, and find it to be a genuine *Macrothrix*, nearly allied to *M. laticornis*, but very different from the form generally recorded as *M. rosea*. The difference is indeed so essential that I have felt justified in restoring Lièvin's genus, at the same time accepting for the type species the specific name *tenuicornis*, under which this form has been recorded by Kurz. The validity of the present genus would seem to be still more corroborated by the discovery recently of some forms, which, though evidently specifically distinct, exhibit a close agreement in all essential characters with the typical species, *Echinisca tenuicornis* (Kurz). Two such species have been described by the present author, the one from South America as *Macrothrix elegans*, the other from New Zealand as *M. Schauinslandi*. A third well-defined species of the present genus belongs to the fauna of Cape Colony, and will be described below.

22. ECHINISCA CAPENSIS, n. sp.

(Plate XXXVI, figs. 1, 1 a-d.)

Specific Characters.—*Female*.—Carapace, seen laterally, broadly oval in outline, and terminating behind in a blunt, nearly central protuberance; dorsal margin much more strongly curved than the ventral, and quite smooth. Head defined above from the carapace by a very slight notch-like depression, and produced below to a compara-

tively short and blunt rostrum, carrying at the end the antennulae, and provided on each side with a distinctly prominent arched crest extending upwards near the dorsal margin; the latter slightly protuberant in the ocular region; lower edge of head behind the rostrum abruptly bulging to form a very conspicuous hump-like protuberance. Surface of shell apparently quite smooth, without any obvious sculpture; free edges of valves clothed with a double row of strong, spiniform setae. Eye well developed, with distinctly prominent crystalline bodies. Ocellus very small and located near the base of the rostrum. Antennulae nearly straight, sublinear in form, with a row of very small spinules inside; apical papillae of moderate size. Antennae rather strongly built, with the proximal setae of lower ramus very coarse and dark-coloured. Epipodite in all the legs simple, sac-like. Tail-piece with the extremity conically produced and carrying on the tip the very small recurved caudal claws; anal denticles minute, almost hair-like; upper part of posterior edge nearly straight and very finely serrate throughout; caudal setae with the distal joint very short, but clothed with long diverging hairs.

Male scarcely half as large as female, and having the carapace comparatively much smaller, with the dorsal margin straight and terminating in an almost rectangular corner. Head large in proportion to the carapace, with the protuberance of the lower edge only slightly indicated. Antennulae very much produced, fully half as long as the body, and provided anteriorly with two delicate sensory setae, the one about in the middle, the other nearer the base. First pair of legs, as usual, each armed at the end with a strong claw. Tail-piece not much differing in shape from that in female, though having the extremity somewhat blunter.

Body in female rather pellucid, with a more or less distinct yellowish-brown tinge, that of male nearly colourless.

Length of female reaching 1.2 mm.

Remarks.—This new species is at once recognised from any of the other forms belonging to the present genus by the very conspicuous hump-like protuberance formed by the lower edge of the head behind the rostrum. It also differs in the simple sac-like shape of the epipodites of the legs.

Occurrence.—I have reared this handsome species in great numbers both from the mud taken at Port Elizabeth, and from one of the parcels of mud kindly sent to me in 1909 by Dr. Purcell and taken from a small dried-up vley on the Cape Flats. It also occurred rather abundantly in an alcoholic sample taken by that gentleman from about the same locality, and kindly sent to me for examination.

GEN. 7. MACROTHRIX, Baird.

Remarks.—In the restriction here adopted, the present genus may be easily distinguished from the preceding one, to which it bears a close relationship, by the somewhat different shape of the head, the rostral part of which is more prominent, and wholly wants the characteristic arched crests in front, present in all the species of *Echinisca*. Moreover, the coarser structure of the antennulae and their pronounced curvature is rather characteristic, as also the short and stout shape of the tail-piece. Several species of this genus have been discovered from different parts of the world; but, as above stated, some of these ought to be transferred to the preceding genus. Two well-defined species belong to the fauna of Cape Colony and will be described below.

23. MACROTHRIX PROPINQUA, G. O. Sars.

(Plate XXXVI, figs. 2, 2 a-c.)

Macrothrix propinqua, G. O. Sars. Fresh-water Entomostraca from South Georgia. Arch. f. Math. u. Naturv. 1909, p. 5, pl. 1.

Specific Characters—*Female*.—Carapace, seen laterally, oval in outline, terminating behind in a short and obtuse protuberance occurring about in the axis of the body; dorsal margin more or less strongly arched and quite smooth, lower edges of valves only slightly curved and exhibiting the usual armature of strong spiniform setae. Head not defined above by any distinct depression from the carapace, and having the dorsal margin evenly curved throughout; rostral part rather prominent and without any trace of lateral crests, lower edge of head behind the rostrum straight. Surface of shell nearly smooth. Eye comparatively large; ocellus much smaller and located nearer to the tip of the rostrum than to the eye. Antennulae rather strongly built and considerably curved, gradually dilated distally, with about six transverse rows of delicate spinules inside, projecting from as many notches of the anterior edge. Antennae of the usual structure. Epipodite of last pair of legs scarcely larger than those on the other legs. Tail-piece short and stout, obtusely truncated at the end, with the hind edge distinctly situated immediately above the anal fissure, anal denticles about ten on each side, apical claws very small, upper part of posterior edge slightly arched and finely denticulate throughout.

Body semipellucid, with a more or less distinct reddish-orange tinge.

Length of shell reaching 0.93 mm.

Remarks.—This form was described by the present author in the year 1909 from specimens collected in South Georgia. It is very closely allied to the northern species *M. hirsuticornis*, Brady, though differing in some particulars rather conspicuously, especially as regards the size of the ocellus and its position in relation to the eye.

Occurrence.—The present form was reared in considerable numbers from the mud kindly forwarded to me in 1909 by Dr. Purcell, and taken in the neighbourhood of Bergvliet.

Distribution.—South Georgia, Falkland Islands, Australia.

24. MACROTHRIX SPINOSA, King.

(Plate XXXVI, figs. 3, 3 a, b.)

Macrothrix spinosa, King. On Australian Entomostraca. Papers and Proc. Roy. Soc., Van Diemen's Land, vol. ii, pt. 2, 1852, p. 256, pl. 6 e.

Specific Characters—Female.—Carapace, seen laterally, broadly oval in outline, and terminating behind in a well-marked though short protuberance occurring about in the axis of the body; dorsal margin evenly curved, ventral slightly bulging in front of the middle. Head of moderate size, with the rostral part comparatively less prominent than in the preceding species, lower edge behind the rostrum straight. Surface of shell sculptured, especially towards the dorsal face, with closely set squamous ridges, giving the upper contours a more or less conspicuous jagged appearance. Eye comparatively smaller than in the preceding species; ocellus extremely minute and located near the end of the rostrum. Antennulae less strongly built than in the preceding species, with the spinules of the inner face shorter. Epipodite of last pair of legs much larger than that of the anterior pairs, forming an elliptical vesicle, generally covering laterally the end of the tail-piece. The latter resembling in shape that in *M. propinqua*, but comparatively shorter and more rounded at the end, with the anal denticles fewer in number.

Body rather pellucid with a faint yellowish tinge.

Length of shell scarcely exceeding 0.54 mm.

Remarks.—The present species was established as early as the year 1852 by King, and was redescribed by the present author in 1888 from specimens raised out of dried Australian mud. It is easily distinguishable from the preceding species by its much smaller size and the conspicuously squamous sculpture of the shell. The form described by the present author from South America as *M. squamosa* is scarcely different from this species.

Occurrence.—This form also developed in great abundance in some of my aquaria prepared with mud from the neighbourhood of Bergvliet. It was also found occasionally in some of the alcoholic samples sent to me from the South African Museum.

Distribution.—Australia, South America.

GEN. 8. ILYOCRYPTUS, G. O. Sars.

Remarks.—This peculiar genus differs considerably from the other genera comprised within the family *Macrothricidae*, both in general appearance and in structural details, and should perhaps more properly be regarded as the type of a separate family. We know of three well-defined European species, and to these have been added recently a limited number of exotic forms more or less closely related to them. To the fauna of Cape Colony belongs one species, to be described below.

25. ILYOCRYPTUS SORDIDUS (Lièvin).

(Plate XXXVII, figs. 1, 1 a-c.)

Acanthocercus sordidus, Lièvin. Die Branchiopoden der Danziger Gegend. N. Schriften d. naturh. gesellsch. in Danzig. vol. iv, 2, 1848, p. 34, pl. viii, figs. 7-12.

Specific Characters—*Female.*—Carapace, seen laterally, subtriangular in outline, gradually expanding behind, with the posterior and inferior edges of the valves of about equal length and passing into each other by a very strong curvature, being throughout fringed with ciliated setae, dorsal margin only very slightly arched and joining the free edges of the valves at an obtuse angle; superposed valves varying in number according to age. Head comparatively small, seen laterally, triangular in form, and defined above from the carapace by a distinct depression, fornix rather prominent and terminating in front in an angular corner; inferior edge of head straight and horizontal, without any distinct rostral projection. Eye remote from the front, with only three or four refracting bodies; ocellus a little smaller than the eye and occurring at a short distance behind it. Antennulae distinctly biarticulate, proximal joint very small, distal joint long and slender, linear in form. Antennae short and thick, not adapted for swimming. Tail-piece large and compressed, conically produced at the tip, and exhibiting in the middle of the posterior edge a distinct sinus, supra-anal margin occupying about half the length of the piece and armed with about ten equal-sized denticles, anal denticles about fourteen pairs, sub-marginal spines rather slender and somewhat curved, about nine on

each side; apical claws slender, each with two hair-like denticles at the base.

Colour bright red.

Length of shell reaching about 1 mm.

Remarks.—I have failed to detect any reliable difference between the above-characterised form and typical specimens of *T. sordidus* taken in Norway. It is the first described species, and accordingly ought to be regarded as the type of the present genus.

Occurrence.—This form developed in great numbers in the bottom-deposit of some of my aquaria prepared with mud from the neighbourhood of Borgvliet. Most of the specimens were covered by a thick coating of mud so firmly adhering to the shell that it was a matter of no little difficulty to remove it, in order to get a correct view of the animal.

Distribution.—Throughout Europe, North and South America, Sumatra, Australia.

FAM. CHYDORIDAE.

GEN. 9. LEYDIGIA, Kurz.

Remarks.—This genus was established in the year 1874 by Kurz, to include the peculiar form described by Fischer as *Lynceus acanthocercoides*. Another form belonging to this genus was recorded by Leydig, but erroneously identified by that author with *Lynceus quadrangularia* Müller. To these two northern forms a few exotic species have in recent times been added. The genus may be easily recognised by the broadly expanded, almost trigonal shell, and by the largely developed caudal piece, which in shape and armature somewhat recalls that in *Hyocryptus*. Three well-defined species of this genus belong to the fauna of Cape Colony, two of them being new to science.

26. LEYDIGIA MACRODONTA, n. sp.

(Plate XXXVII, figs. 2, 2 a, b.)

Specific Characters—Female.—Shell, seen laterally, broadly triangular in outline, and considerably expanded behind, dorsal margin nearly straight in its posterior part, but anteriorly forming a quite even curve until the tip of the rostrum; upper posterior corner well marked; hind edges of valves very oblique and almost straight, passing into the inferior ones by a very strong curvature. Head slightly procumbent, with the rostral projection scarcely curved, and

pointing obliquely downwards. Surface of shell without any obvious sculpture, lower edges of valves, as usual, densely clothed with delicate, partly finely ciliated setae. Eye comparatively small; ocellus, on the other hand, very fully developed, being about three times as large and triangular in form. Antennulae extending almost to the tip of the rostrum. Tail-piece large and expanded, with the distal part of the hind edge, below the anal sinus, gently curved and minutely ciliated, submarginal spines unusually long and slender, about eight on each side, each of the spines being accompanied above with two much smaller spinules; apical claws rather slender and only slightly curved, each with a very minute denticle at the base.

Colour bright red.

Length of shell reaching 1·2 mm.

Remarks.—This is a very distinct species, easily recognisable from the other known forms of the present genus by the quite smooth shell and by the very long and slender sub-marginal spines of the tail-piece, the latter character having indeed suggested the specific name here proposed. It is also of larger size than any of the other species.

Occurrence.—This handsome form was reared in considerable numbers from one of the parcels of mud kindly sent to me by Dr. Purcell in 1909, and procured from a small pool in the Cape Flats, alongside the railway line between Retreat and Lakeside. Only female specimens of this form were observed.

27. LEYDIGIA PROPINQUA, G. O. Sars.

(Plate XXXVIII, figs. 1, 1 a, b.)

Leydigia propinqua, G. O. Sars. Fresh-water Entomostraca from China and Sumatra. Arch. f. Math. u. Naturv., 1903, p. 14, pl. 1, figs. 4, 4 a.

Specific Characters—Female.—Shell, seen laterally, broadly triangular in outline, widening distally, and less obliquely truncated behind than in the preceding species; dorsal margin evenly arched throughout, hind edges of valves with a very conspicuous bulging in the middle. Head only slightly procumbent, rostral projection comparatively short and obtuse. Surface of valves very distinctly sculptured with somewhat irregular longitudinal striae partly anastomosing with each other. Eye of moderate size; ocellus scarcely larger and located nearly in the middle between the eye and the tip of the rostrum. Antennulae scarcely extending as far as the latter. Tail-piece very broad and expanded, with the distal part of the hind edge boldly curved; sub-marginal spines less slender than in the preceding species and

about eight in number on each side, each of the spines only accompanied by a single spinule; apical claws each with an extremely minute denticle at the base.

Colour reddish-orange.

Length of shell scarcely exceeding 0.9 mm.

Remarks.—This form was described by the present author in both sexes as early as the year 1895 from specimens raised out of mud taken at Knysna. It was, however, at that time erroneously identified with the European species *L. acanthocercoules* (Fischer), from which it in reality differs, both in the general outline of the shell and in the larger size of the eye as compared with the ocellus. The form recorded by Mr. Gurney from Kroonstad as *L. africana* is scarcely different from the present species.

Occurrence.—Besides from the Knysna-mud, I have reared this form rather abundantly from some of the parcels of mud kindly forwarded to me in 1909 by Dr. Purcell, and taken in the neighbourhood of Bergvliet.

Distribution.—Sumatra.

28. LEYDIGIA MICRIPS, n. sp.

(Plate XXXVIII, figs. 2, 2 a-d.)

Specific Characters—Female.—Shell, seen laterally, of the usual broadly triangular form, with the dorsal margin somewhat irregularly curved; hind edges of valves obliquely arcuate, without any obvious bulging in the middle. Head comparatively more produced than in the two preceding species, with the rostral projection acuminate and slightly recurved at the end. Surface of valves sculptured with rather faint longitudinal striae. Eye extremely small, punctiform; ocellus well developed, resembling in size and shape that in *L. propinqua*; its distance from the eye scarcely more than half that from the tip of the rostrum. Antennulae not nearly extending as far as the latter. Tail-piece less expanded than in the two preceding species and obtusely truncated at the end, hind edge nearly straight and joining the end edge by a strong curve; sub-marginal spines rather numerous, twelve to fourteen on each side, but rapidly diminishing in size proximally, each spine being accompanied by a somewhat smaller spinule; apical claws each with a series of very delicate denticles in their proximal half.

Male much smaller than female and having the dorsal margin of the carapace straight. Antennulae much thicker than in female. First pair of legs each armed with a very strong hook. Tail-piece very

unlike that in female, being much narrower and conically tapered distally, with the end produced in front of the rather small apical claws into a cylindrical appendage containing the terminal part of the vasa deferentia; sub-marginal spines fewer in number and densely crowded below.

Colour of female more or less bright red, that of male much paler.

Length of female reaching 0·86 mm.

Remarks.—This new species is especially characterised by the imperfect development of the eye, which is smaller than in any of the other species known to me. It may also be easily distinguished from the two preceding species by the more produced rostrum and by the shape and armature of the tail-piece.

Occurrence.—Specimens of this form were reared from mud taken in three different localities, viz. Green Point Common, Klipdam, and neighbourhood of Bergvliet. Except in the Klipdam mud, it only occurred very occasionally.

GEN. 10. ALONA, Baird.

Remarks.—The species of this genus may generally be recognised by the compressed more or less quadrangular shell, the valvular part of which, as a rule, is sculptured with regular longitudinal striae. The genus is very rich in species, and is also well represented in the fauna of Cape Colony, no less than nine different species being distinguished, four of which are apparently new to science.

29. ALONA AFFINIS (Leydig).

(Plate XXXIX, figs. 1, 1 a.)

Lynceus affinis, Leydig. Naturgeschichte der Daphniden, 1860, p. 223, pl. ix, figs. 68 and 69.

Syn. : *Lynceus quadrangularis*, Fischer (not Müller).

„ *Alona oblonga*, P. E. Müller.

Specific Characters—Female.—Shell, seen laterally, oblong oval in outline and somewhat obliquely truncated behind, dorsal margin evenly curved throughout, hind edges of valves slightly arcuate, lower ones nearly straight. Head only slightly procumbent, with the rostral corner rather prominent and pointing obliquely in front. Surface of valves sculptured with faint, somewhat distant longitudinal striae. Eye of moderate size; ocellus a little smaller, and about twice as remote from the tip of the rostrum as from the eye. Antennulae not nearly extending as far as the rostrum. Tail-piece rather strongly

built and nearly of uniform width throughout, end truncated, with the hind corner obtuse-angular; supra-anal prominence very slight, infra-anal margin armed with about thirteen pairs of rather coarse denticles, sub-marginal combs well marked, about twelve on each side; apical claws rather strong, each with a coarse denticle at the base accompanied proximally by a series of small spinules.

Length of the specimen examined, 0.9 mm.

Remarks.—The above-characterised form is unquestionably identical with the European species *A. affinis* (Leydig), agreeing in every detail exactly with typical specimens taken in Norway. It is one of the largest species of the genus, and is moreover easily recognised by the comparatively narrow oblong form of the shell, the rather produced rostral part, and the structure of the tail-piece.

Occurrence.—A single but well-preserved female specimen of this form, that here figured, was found in an alcoholic sample taken by Dr. Purcell from a pond in the Cape Flats, and kindly sent to me for examination.

Distribution.—Throughout Europe, Central Asia, Siberia, Greenland, North and South America, Azores.

30. ALONA HARPULARIA, n. sp.

(Plate XXXIX, figs. 2, 2 a.)

Specific Characters—Female.—Shell, seen laterally, oval quadrangular in outline, being almost transversely truncated behind; dorsal margin abruptly curved in the cervical region, hind edges of valves nearly straight, with the upper corner well marked, the lower rounded off. Head rather procumbent, with the rostral corner less prominent than in the preceding species. Surface of valves sculptured with regular, somewhat distant longitudinal striae. Ocellus scarcely smaller than the eye, and located at about midway between it and the tip of the rostrum. Antennulae nearly extending as far as the latter. Tail-piece comparatively short and obtusely truncated at the end, with the hind corner rounded off; supra-anal angle well marked; infra-anal margin with about eight pairs of very small denticles, sub-marginal combs very delicate but distinct, about twelve on each side, apical claws with the basal denticle rather slender.

Body pellucid with a slight greenish tinge.

Length of shell reaching 0.55 mm.

Remarks.—This form is closely allied to the New Zealand species, *A. eucostata*, G. O. Sars, but is of larger size, and moreover differs in the somewhat more distant and less strongly marked striae of the

valves. The form and armature of the tail-piece is also a little different.

Occurrence.—Numerous specimens of this form developed in some of my aquaria prepared with mud from Port Elizabeth.

31. *ALONA ARCUATA*, n. sp.

(Plate XXXIX, figs. 3, 3 a.)

Specific Characters.—*Female*.—Shell, seen laterally, very broad, rounded oval in outline, with the dorsal margin boldly arched in the middle, hind extremity obtusely truncated, with the upper corner obtuse-angular, the lower rounded off. Head rather procumbent, with the rostral corner somewhat more prominent than in *A. harpularia*. Surface of valves sculptured with rather closely set and somewhat wavy longitudinal striae, partly anastomosing with each other, and in the anterior part of the valves crossed by a number of transverse arcuate striae. Ocellus a little smaller than the eye and somewhat nearer to it than to the tip of the rostrum. Antennulae not extending as far as the latter. Tail-piece resembling in shape somewhat that in *A. harpularia*, but comparatively less broad in its distal part, with the infero-posteal corner less prominent; supra-anal angle only slightly produced, infra-anal denticles very small, sub-marginal combs inconspicuous; apical claws about as in the preceding species.

Body pellucid, with a faint yellowish-green tinge.

Length of shell reaching 0.43 mm.

Remarks.—This form looks rather like *A. harpularia*, and as it was found together with that species, I at first believed it to be merely a variety. A closer examination, however, has convinced me that it in reality is specifically distinct, exhibiting, as it does, some well-marked differences named in the above diagnosis.

Occurrence.—Only a few specimens of this form have come under my notice. They were found in one of my aquaria prepared with mud from Port Elizabeth.

32. *ALONA STRIOLATA*, n. sp.

(Plate XXXIX, figs. 4, 4 a.)

Specific Characters.—*Female*.—Shell, seen laterally, oval quadrangular in outline, with the dorsal margin evenly arched, hind extremity transversely truncated, with the lower corner subangular; inferior edges of valves nearly straight. Head somewhat less procumbent than in the two preceding species, with the rostral corner rather prominent. Surface of valves exhibiting an exceedingly dense and

delicate striation, the striae also extending on the dorsal surface of the head. Eye of larger size than in most other species, and provided with numerous crystalline bodies; ocellus smaller than the eye, though well developed, and located much nearer to it than to the tip of the rostrum. Antennulae not nearly extending as far as the latter. Tail-piece not much produced and somewhat contracted in its distal part, supra-anal angle well marked, infra-anal denticles inconspicuous, sub-marginal combs, however, distinct and about twelve in number on each side; apical claws moderately strong, but with the basal denticle comparatively small.

Body of a whitish-grey colour and less pellucid than in the other species, owing to the dense sculpture of the shell.

Length of shell reaching 0.48 mm.

Remarks.—This is a very distinct species, being at once distinguished from all the other forms here recorded by the very dense and delicate striation of the shell. In this respect it approaches somewhat to the European species *A. elegans*, Kurz, which, however, in other respects is rather different.

Occurrence.—Some specimens of this form were reared in one of my aquaria prepared with mud from Green Point Common, near Cape Town.

33. *ALONA INTERMEDIA*, G. O. Sars.

(Plate XXXIX, figs. 5, 5*a*.)

Alona intermedia, G. O. Sars. Om dei Omegnen af Christiania forekommende Cladocerer. Chr. Vid. Selsk. Forh. f. 1861, p. 38.

Specific Characters—Female.—Shell, seen laterally, oblong oval in outline and somewhat widening behind, with the dorsal margin evenly arched, hind edges of valves somewhat obliquely curved, lower edges straight. Head not much procumbent, with the rostral corner rather prominent. Surface of valves sculptured with rather distant and not very strongly marked longitudinal striae. Eye comparatively small; ocellus fully as large, and located a little nearer to it than to the tip of the rostrum. Antennulae not nearly extending as far as the latter. Tail-piece of a very characteristic shape, being conspicuously expanded in its distal part and almost transversely truncated at the end; supra-anal angle rather prominent; infra-anal denticles small, but distinct; sub-marginal combs unusually coarse, about ten on each side; apical claws of moderate size, with the basal denticle rather slender.

Length of shell about 0.47 mm.

Remarks.—This species was established as early as the year 1861 by the present author, and has subsequently been recorded by several

other naturalists. It is especially distinguished by the shape and armature of the caudal piece.

Occurrence.—Two well-preserved female specimens of this form were found in an alcoholic sample taken by Dr. Purcell from a pond in the Cape Flats, and kindly sent to me for examination.

Distribution.—Norway, Sweden, Finland, South America.

34. *ALONA CRASSICAUDA*, n. sp.

(Plate XL, figs. 1, 1 a.)

Specific Characters.—*Female*.—Shell, seen laterally, oval in outline, with the dorsal margin quite evenly arched throughout, ventral straight or slightly concave in the middle, hind extremity obtusely truncated, with no distinct angle either above or below. Head somewhat procumbent, with the rostral corner moderately produced and curved downwards. Surface of valves indistinctly striated, exhibiting slight traces of an irregular reticulation. Ocellus somewhat smaller than the eye, and located a little nearer to it than to the tip of the rostrum. Antennulae nearly extending as far as the latter. Tail-piece comparatively short, but unusually strongly built, being rather thick at the base and slightly narrowed towards the extremity, which is transversely truncated; supra-anal angle not much prominent, and occurring nearly in the middle of the piece; infra-anal denticles rather irregular, the two or three distal ones on each side much coarser than the others; sub-marginal combs well marked, about eight on each side; apical claws rather coarse, with the basal denticle of moderate size.

Body pellucid, with a slight yellowish-brown tinge.

Length of the specimen examined, 0.48 mm.

Remarks.—I cannot identify the above-characterised form with any of the known species. The nearest ally seems to be *A. cambouci*, Richard; but the form and armature of the tail-piece is rather different.

Occurrence.—Only a single female specimen of this form has hitherto come under my notice. It was found in one of my aquaria prepared with mud taken by Dr. Purcell from an old brick-pond near Bergvliet.

35. *ALONA PULCHELLA*, King.

(Plate XL, figs. 2, 2 a.)

Alona pulchella, King. On Australian Entomostraca. Papers and Proc. Roy. Soc. Van Diemen's Land, vol. ii, part ii, 1852, p. 260, pl. viii b.

Specific Characters—Female.—Shell, seen laterally, oblong oval in outline, with the dorsal margin evenly arched, ventral nearly straight, hind extremity obtusely truncated. Head not much procumbent, with the rostral corner moderately produced. Surface of valves sculptured with somewhat distant longitudinal striae, partly anastomosing with each other. Ocellus smaller than the eye, and located much nearer to it than to the tip of the rostrum. Antennulae almost extending as far as the latter. Tail-piece somewhat produced, with the distal part comparatively narrow and of uniform width throughout, and transversely truncated, with the hind corner sub-angular; supra-anal angle rather slight, and occurring far above the middle of the piece; infra-anal denticles well marked, and gradually somewhat increasing in size distally; sub-marginal combs about nine on each side; apical claws attached to a short conical prominence and rather slender, with the basal denticle of moderate size.

Length of shell about 0.42 mm.

Remarks.—This form was recorded as early as the year 1852 by King, and was subsequently redescribed by the present author from specimens collected by Dr. Th. Whitelegge in the neighbourhood of Sydney. It may easily be recognised from any of the species here recorded by the shape and armature of the tail-piece.

Occurrence.—Some few specimens of this form were found in an alcoholic sample procured by Dr. Purcell from a dam near Bergvliet, and kindly sent to me for examination.

Distribution.—Australia.

36. *ALONA BUKOBENSIS*, Welthner.

(Plate XL, figs. 3, 3*a*.)

Alona bukobensis, Welthner. Die Cladocerer Ost Africas, 1897, p. 9, pl. i, figs. 16–18, 20, pl. 2, fig. 32.

Specific Characters—Female.—Shell, seen laterally, oblong quadrangular in outline, with the dorsal margin gently arched, ventral nearly straight, posterior extremity obtusely truncated, with the upper corner well marked, lower rounded off. Head somewhat procumbent, with the rostral corner moderately produced and obtuse at the tip. Surface of valves sculptured with somewhat distant and rather faint longitudinal striae, in some places anastomosing with each other. Ocellus almost as large as the eye, and located nearer to it than to the tip of the rostrum. Antennulae almost extending as far as the latter. Tail-piece comparatively short, but rather broad and scarcely narrowed distally, infero-posteal corner evenly rounded off; supra-anal angle

slightly prominent and occurring near the middle of the piece; marginal denticles very small, sub-marginal combs well marked, about ten on each side; apical claws of moderate size, with the basal denticle rather slender.

Body very pellucid, with a faint yellow tinge.

Length of shell scarcely exceeding 0.35 mm.

Remarks.—I think I am right in identifying the above-characterised small *Alona* with the species recorded by Welthner from East Africa. The description and figures given by that author are certainly rather unsatisfactory, and it is even possible that several nearly allied species have been confounded by him; but on the whole I cannot see any reliable difference, and the measurements of the shell given (0.24–0.35) agree fairly well with those of the present species, which, indeed, is by far the smallest of the South African species of *Alona*.

Occurrence.—This form developed very abundantly in several of my aquaria prepared with mud partly from Port Elizabeth, partly from the neighbourhood of Cape Town.

Distribution.—East Africa.

37. ALONA KARUA, King.

(Plate XL, figs. 4, 4a.)

Alona karua, King. L.c. 1852, p. 260, pl. viii d.

Syn.: *Alonella karua*, G. O. Sars.

„ *Alona mülleri*, Richard.

„ *Leydigia quadridentata*, Brady.

Specific Characters—*Female*.—Shell, seen laterally, irregularly quadrangular in outline, with the dorsal margin considerably arched in the middle, ventral straight in its posterior part, but conspicuously ascending anteriorly; posterior extremity somewhat obliquely truncated, with the upper corner well marked, lower rounded off. Head less procumbent than in most other species, with the rostral corner rather prominent and pointing obliquely forwards. Surface of valves sculptured with very distinct and somewhat oblique striae, crossed in the anterior part of the valves by a number of arcuate ridges running parallel to the anterior edges; inferior edges, as usual, densely setiferous, and exhibiting, moreover, just in front of the infero-posteal corner, a row of three to five small denticles. Ocellus smaller than the eye, and located much nearer to it than to the tip of the rostrum. Antennulae not nearly extending so far as the latter. Tail-piece comparatively short, but rather broad, widening somewhat distally, with the infra-anal margin evenly curved throughout; supra-anal angle very slight, and

occurring far above the middle of the piece; marginal denticles inconspicuous, sub-marginal combs, however, well marked, and varying in number from six to ten on each side; apical claws attached to a well-marked conical prominence and rather coarse, basal denticle, however, very small.

Colour dark yellow, or corneous.

Length of shell reaching 0.43 mm.

Remarks.—This form was recorded by King under the above name at the same time as *A. pulchella*, and was redescribed in 1888 by the present author from a specimen raised out of Australian mud. It has also in recent times been observed by some other authors; but its identity has not always been recognised. Thus I have elsewhere shown that the *Alona mülleri* of Richard is identical with the present species, and also the form recently recorded by Brady from the Victoria Falls under the name of *Leydigia quadridentata* is unquestionably the same species. I have formerly referred this form to the genus *Alonella*, but am now of opinion that it should more properly be retained in the genus *Alona*, as the oblique striation of the anterior part of the valves is also found in some evidently genuine species of *Alona*, for instance, in the above-described *A. arcuata*.

Occurrence.—This easily recognisable form developed rather abundantly in one of my aquaria prepared with mud taken by Dr. Purcell from a small grassy vley on the Cape Flats.

Distribution.—Australia, South America, Ceylon.

GEN. II. ALONELLA, G. O. Sars.

Remarks.—This genus was established by the present author in the year 1862, to include four European species. To these there have been added in recent times a number of exotic forms, especially from South America; but some of these are, in reality, so deviating from the European types as scarcely to be congeneric. To the fauna of Cape Colony belongs one genuine species of the present genus.

38. ALONELLA EXCISA (Fischer).

(Plate XL, figs. 5, 5a.)

Lynceus excisus, Fischer. Bull. Soc. Imp. d. naturalistes de Moscou, 1854, p. 428, pt. iii, figs. 11-14.

Specific Characters—Female.—Shell, seen laterally, oval subquad-rangular in outline, with the dorsal margin evenly arched, the ventral straight behind and ascending in front, posterior extremity somewhat

narrowed and transversely truncated, with both the upper and lower corners distinctly angular. Head only slightly procumbent, and terminating in a rather prominent rostrum, slightly curved at the end. Surface of valves sculptured with well-marked, somewhat curved longitudinal striae, which at regular intervals anastomose with each other, so as to form a rather conspicuous reticulation, and in the anterior part are crossed by a number of transverse arcuate ridges; posterior edges of valves exhibiting, just above the lower corner, two or three slight crenulations. Ocellus smaller than the eye, and located much nearer to it than to the tip of the rostrum. Antennulae not nearly extending as far as the latter. Tail-piece rather narrow and slightly tapered distally, with the infra-anal edge nearly straight and terminating in an angular corner; supra-anal angle rather prominent, and occurring far above the middle of the piece; marginal denticles rather small; sub-marginal combs inconspicuous; apical claws comparatively small, each with two unequal denticles at the base.

Length of shell about 0.37 mm.

Remarks.—The above-characterised form is unquestionably identical with Fischer's species, and is distinguished from the nearly-allied Australian species *A. clathratula*, G. O. Sars, by a somewhat shorter and stouter form of the shell, and more particularly by the presence of distinct crenulations of the hind edges of the valves at the infero-posteal corners, these crenulations being wholly absent in the former species.

Occurrence.—Two or three specimens of this form were found in an alcoholic sample taken by Dr. Purcell from a pond in the Cape Flats, and kindly sent to me for examination.

Distribution.—Throughout Europe, Siberia, Iceland, Greenland, North America.

GEN. 12. CHYDORUS, Baird.

Remarks.—The species of this genus may be easily recognised by the more or less globular shape of the shell. Most of them are so closely allied that their distinction is attended with no little difficulty; but there are also among them some more deviating forms, one of which will be described below.

39. CHYDORUS BARROISI (Richard).

(Plate XL, figs. 6, 6a, b.)

Pleuroxus barroisi, Richard. Cladocères recueillis en Syrie et en Egypte. Revue Biol. du Nord de France, Tome vi, 1893, p. 16.

Specific Characters—Female.—Shell very tumid, seen laterally almost circular in outline, with the dorsal margin boldly arched, the ventral bulging in the middle, but nearly straight behind; posterior extremity narrowly truncated. Head rather procumbent, and terminating in a slightly curved acute rostrum; surface of valves sculptured in their anterior part, with very distinct curved striae running parallel to the anterior edges, the posterior part exhibiting a more or less conspicuous reticulation; infero-posteal corners armed with a distinct curved denticle. Ocellus smaller than the eye, and located somewhat nearer to it than to the tip of the rostrum. Antennulae comparatively small. Lower expansion of the labrum securiform and having the edge divided into four well-marked serrations. Tail-piece with the distal part rather narrow and incised at the end; supra-anal angle considerably prominent, and occurring almost in the middle of the piece; marginal denticles well marked, about ten on each side, the three posterior pairs more prolonged than the others; apical claws comparatively short, each with two unequal denticles at the base.

Colour dark yellowish-grey.

Length of shell about 0·3 mm.

Remarks.—This form was first described by Richard as a species of the genus *Pleuroxus*; but was subsequently referred by the present author to the genus *Chydorus*, to which it evidently bears a much nearer relationship, though differing in some points from the more typical species of that genus.

Occurrence.—The present characteristic form was reared in considerable numbers from the Knysna mud, but did not develop from any of the other parcels received.

Distribution.—Palestine, South America.

40. CHYDORUS LEONARDI, King.

Chydorus leonardi, King. L.c. 1852, p. 258, pl. vii c.

Remarks.—This cosmopolitan species (not figured in the plates) must also be included in the fauna of Cape Colony, as several specimens were found in two alcoholic samples taken by Dr. Purcell from ponds in the neighbourhood of Cape Town. The same form also appeared abundantly in nearly all my aquaria, though an accidental transfer together with the aquatic plants, which for the sake of aëration of the water were introduced in them, was not excluded. By most authors this form is regarded as only a small variety of the common *Chydorus sphaericus* (Müller).

GEN. 13. EURYALONA, G. O. Sars.

Remarks.—This genus was established in the year 1901 by the present author, to include a *Chydorus* raised out of dried mud from the Argentine, and named *E. occidentalis*, its true relation to the previously described species, *Alonopsis colletti*, not being at that time recognised. The genus is chiefly characterised by the broadly expanded and quite smooth shell, as also by the slender form of the tail-piece.

41. EURYALONA COLLETTI (G. O. Sars).

(Plate XLI, figs. 1, 1 a, b.)

Alonopsis colletti, G. O. Sars. On some South African Entomostraca raised from dried mud. Chr. Vid. Selsk. Skrifter f. 1895, p. 22, pl. 4, figs. 5-8.

Syn.: *Euryalona occidentalis*, G. O. Sars.

Specific Characters—Female.—Shell, seen laterally, broadly quadrangular in outline, with the dorsal margin evenly arched, ventral slightly flexuose, posterior extremity obtusely truncated, with the upper corner obtuse-angular, the lower rounded off. Head comparatively small and slightly procumbent, with the rostral corner not much produced and pointing obliquely forward. Surface of valves smooth, without any obvious sculpture, except a faint concentric dotting near the free edges. Ocellus a little smaller than the eye and located nearly midway between it and the tip of the rostrum. Antennulae comparatively small, not nearly extending as far as the latter. Tail-piece very slender and elongated, slightly tapering distally, and deeply incised at the end, with the hind corner rather prominent; supra-anal angle slight and far remote from the middle; marginal denticles well developed and equal-sized, sub-marginal combs only faintly indicated; apical claws slender and only slightly curved, each round at the base with a single rather large denticle; outer part of the claws quite smooth.

Colour more or less dark yellowish-brown.

Length of shell somewhat exceeding 1 mm.

Remarks.—I have convinced myself of the complete identity of the South African and South American forms, and, of course, the specific name at first proposed ought to be retained for the present species. The form recorded by Dr. Daday from Ceylon as *Alonopsis orientalis* is evidently congeneric, but differs, according to the figures given by that author, both in the general form of the shell and in the armature

of the tail-piece. A third species belonging to this genus has been added recently by the same author from Paraguay.

Occurrence.—This form was originally described from specimens reared from dried mud taken at Knysna. It did not develop from any of the other parcels of mud subsequently received.

Distribution.—South America.

GEN. 14. PLEUROXUS, Baird.

Remarks.—The species of this genus are recognised by the more or less pronounced trigonal form of the shell, and the strongly produced acuminate rostrum, which admits of being closely appressed to the anterior part of the valves. About twenty species have been recorded from different parts of the world, one of them being also represented in the fauna of Cape Colony.

42. PLEUROXUS INERMIS, G. O. Sars.

(Plate XLI, figs. 2, 2 a, b.)

Pleuroxus inermis, G. O. Sars. Fresh-water Entomostraca from the neighbourhood of Sydney. Arch. f. Math. u. Naturv. 1896, p. 31, pl. 5, figs. 8, 9.

Specific Characters—Female.—Shell, seen laterally, oval trigonal in outline, with the dorsal margin boldly arched in the middle, ventral slightly flexuose and protuberant in front of the middle; posterior extremity somewhat exerted and narrowly truncated, with the upper corner well marked, the lower obtuse and without any obvious denticles. Head comparatively short and strongly procumbent, terminating in a long and sharply pointed rostrum, pointing obliquely backwards. Anterior part of valves sculptured with a number of very conspicuous arched striae running parallel to the anterior edges; posterior part smooth, or with a very faintly indicated reticulation. Ocellus much smaller than the eye and far remote from the tip of the rostrum. Antennulae comparatively small, scarcely extending beyond the middle of the rostrum. Tail-piece of moderate size, with the anal sinus well marked; distal part slightly narrowed and shallowly incised at the end; supra-anal angle very slight; marginal denticles comparatively small, about fifteen pairs; apical claws rather strong, each with two unequal denticles at the base.

Length of shell about 0.55 mm.

Remarks.—This form was described under the above name in 1896 by the present author from Australian specimens. It is closely allied

to the European species *P. aduncus* (Jurine), exhibiting a very similar sculpture of the valves, but is at once distinguished by the absence of the strong denticles occurring in that species at the infero-posteal corners of the valves; hence the specific name proposed.

Occurrence.—Several specimens of this form were picked out from an alcoholic sample taken by Dr. Purcell from a pond in the Cape Flats and kindly sent to me for examination. It was not reared in any of my aquaria.

Distribution.—Australia.

GEN. 15. DUNHEVEDIA, King.

Syn.: *Crepidocercus*, Birge.

Remarks.—This is a very distinct genus, being especially characterised by the tumid shell, the greatly prominent cephalic fornix, and the peculiar structure of the tail-piece. It contains as yet only a very limited number of species, one of which is represented in the fauna of Cape Colony.

43. DUNHEVEDIA CRASSA, King.

(Plate XLI, figs. 3, 3 a-c.)

Dunhevedia crassa, King. L.c., 1852, p. 261, pl. vii f.

Specific Characters—*Female*.—Shell very tumid, seen laterally irregularly oval in outline, with the dorsal margin boldly arched, the ventral nearly straight, or slightly flexuose, and forming at the junction with the anterior edge a broad, somewhat projecting curve, posterior extremity slightly exerted and narrowly truncated, with the upper corner well marked, the lower rounded off and armed in front on each valve with a well-marked, somewhat deflexed denticle. Head very broad as seen dorsally or ventrally, and somewhat procumbent, with the rostral corner acute and curved downwards. Surface of valves smooth, without any obvious sculpture, inferior edges densely fringed with finely ciliated setae. Eye rather fully developed, with a number of very conspicuous crystalline bodies projecting in front of the dark pigment; ocellus much smaller and located a little nearer to the eye than to the tip of the rostrum. Antennulae not nearly extending as far as the latter. Lip-plate with the edge quite smooth. Tail-piece almost boat-shaped, being abruptly bent at the base, with the posterior edge bulging in the middle, below the anal fissure, to form a broadly rounded heel-shaped protuberance; distal part of the piece gradually tapering to an obtuse apex, and clothed on

each side and along the straight lower edge with fine hair-like spinules; apical claws short and strongly curved, each with a well-marked denticle at the base; supra-anal angle very slight and occurring at a short distance from the base.

Colour more or less dark yellowish-brown.

Length of shell reaching 0.48 mm.

Remarks.—This form was recorded as early as the year 1852 by King, and was re-described by the present author in 1888 from specimens raised out of dried Australian mud. It is closely allied to *D. setigera* (Birge), chiefly differing in the want of any distinct sculpture of the valves. From the likewise closely allied South American species *D. odontoplax* it may at once be distinguished by the perfectly smooth edge of the lip-plate.

Occurrence.—This form developed rather abundantly in some of my aquaria prepared with mud from Port Elizabeth.

Distribution.—Australia, Ceylon.

EXPLANATION OF THE PLATES.

PLATE XXIX.

Daphnia magna, Straus.

FIG.

1. Adult female, viewed from left side (antennae not fully drawn).
- 1a. Rostral part of head (with antennula).
- 1b. Tail-piece.

Daphnia dolichocephala, G. O. Sars.

2. Adult female, lateral view.
- 2a. Rostral part of head, with antennula.
- 2b. Tail-piece.

Daphnia hodgsoni, n. sp.

3. Adult female of the earlier generations, lateral view (antennae not fully drawn).
- 3a. Rostral part of head, with antennula.
- 3b. Tail-piece.

PLATE XXX.

Daphnia coronata, n. sp.

1. Ephippial female, lateral view.
- 1a. Another female without ephippium, dorsal view.
- 1b. Occipital part of head.
- 1c. Rostral part of head, with antennula.
- 1d. Tail-piece.
- 1e. Extremity of same, more highly magnified.
- 1f. Anterior part of body of an adult male, lateral view (antenna omitted).

Daphnia thomsoni, G. O. Sars.

2. Adult female of the earlier generations, lateral view.
- 2a. Rostral part of head, with antennula.
- 2b. Tail-piece.
- 2c. Extremity of same, more highly magnified.

PLATE XXXI.

Daphnia propinqua, G. O. Sars.

1. Adult female, lateral view.
- 1a. Frontal part of head.
- 1b. Tail-piece.

Daphnia tenuispina, n. sp.

2. Adult female, lateral view.
- 2a. Frontal part of head.
- 2b. Tail-piece.

Simosa australicis (Dana).

3. Adult female of the earlier generations, lateral view.
- 3a. Rostral part of head, with antennula.
- 3b. Tail-piece.

PLATE XXXII.

Simosa vetuloides (G. O. Sars).

1. Adult female, lateral view.
- 1a. Head of same, more highly magnified.
- 1b. Tail.

Simosa capensis (G. O. Sars).

2. Adult female, lateral view.
- 2a. Frontal part of head.
- 2b. Tail-piece.

Scapholeberis kingi, G. O. Sars.

3. Adult female, lateral view.
- 3a. Head of same, more highly magnified (antennae omitted).
- 3b. Tail-piece.

PLATE XXXIII.

Ceriodaphnia producta, n. sp.

1. Adult female, lateral view.
- 1a. Head of same, more highly magnified (antennae omitted).
- 1b. Tail.

Ceriodaphnia reticulata (Jurine) var. *minor*, n.

2. Adult female, lateral view (antennae not fully drawn).
- 2a. Frontal part of head.
- 2b. Tail-piece.

Ceriodaphnia quadrangula (Müller), var.

3. Adult female, lateral view.
- 3a. Frontal part of head.
- 3b. Tail-piece.
- 3c. Posterior protuberance of shell.
- 3d. Male antennulae.

PLATE XXXIV.

Ceriodaphnia dubia, Richard.

1. Adult female of the earlier generations, lateral view.
- 1a. Head of same, without the antennae.
- 1b. Tail.

Ceriodaphnia laticaudata, P. E. Müller.

2. Adult female, lateral view.
- 2a. Frontal part of head.
- 2b. Tail.

Ceriodaphnia rigaudi, Richard.

3. Adult female, lateral view.
- 3a. Frontal part of head.
- 3b. Tail.

PLATE XXXV.

Moina macrocopa (Straus).

1. Adult gravid female, lateral view.
- 1a. Tail.
- 1b. Ephippium.

Moina tenuicornis, G. O. Sars.

2. Adult gravid female, lateral view.
- 2a. Antennula.
- 2b. Tail-piece.
- 2c. Extremity of same, more highly magnified.

Moina brachiata (Jurine).

3. Adult gravid female, lateral view.
- 3a. Tail-piece.
- 3b. Extremity of same, more highly magnified.

Moina dubia, Richard.

4. Adult gravid female, lateral view.
- 4a. Tail-piece.

PLATE XXXVI.

Echinisca capensis, n. sp.

1. Adult female of the earlier generations, lateral view.
- 1a. Frontal part of head.
- 1b. Antennula.
- 1c. Tail, with epipodite of last leg.
- 1d. Adult male, lateral view.

Macrothrix propinqua, G. O. Sars.

2. Adult female of the earlier generations, lateral view.
- 2a. Antennula.
- 2b. Tail with epipodite of last leg.

Macrothrix spinosa, King.

3. Adult female of the earlier generations, lateral view.
- 3a. Tip of rostrum with antennula.
- 3b. Tail with epipodite of last leg.

PLATE XXXVII.

Ilyocryptus sordidus (Lièvin).

1. Adult female, with 5 superposed valves, lateral view.
- 1a. Head and adjacent part of carapace (antennae omitted).
- 1b. Antenna.
- 1c. Tail-piece.

Leydigia macrodonta, n. sp.

2. Adult female, lateral view.
- 2a. Inferior part of head.
- 2b. Tail-piece.

PLATE XXXVIII.

Leydigia propinqua, G. O. Sars.

1. Adult female, lateral view.
- 1a. Inferior part of head.
- 1b. Tail-piece.

Leydigia microps, n. sp.

2. Adult female, lateral view.
- 2a. Inferior part of head.
- 2b. Tail-piece.
- 2c. Adult male, lateral view.
- 2d. Tail-piece of same.

PLATE XXXIX.

Alona affinis (Leydig).

1. Adult female, lateral view.
- 1a. Tail-piece.

Alona harpularia, n. sp.

2. Adult female, lateral view.
- 2a. Tail-piece.

Alona arcuata, n. sp.

3. Adult female, lateral view.
- 3a. Tail-piece.

Alona striolata, n. sp.

4. Adult female, lateral view.
- 4a. Tail-piece.

Alona intermedia, G. O. Sars.

5. Adult female, lateral view.
- 5a. Tail-piece.

PLATE XL.

Alona crassicauda, n. sp.

1. Adult female, lateral view.
- 1a. Tail-piece.

Alona pulchella, King.

2. Adult female, lateral view.
- 2a. Tail-piece.

Alona bukobensis, Welthner.

3. Adult female, lateral view.
- 3a. Tail-piece.

Alona karua, King.

4. Adult female, lateral view.
- 4a. Tail-piece.

Alonella excisa (Fischer).

- 5. Adult female, lateral view.
- 5a. Tail-piece.

Chydorus barroisi (Richard).

- 6. Adult female, lateral view.
- 6a. Inferior part of head, with adjoining part of valve.
- 6b. Tail-piece.

PLATE XLI.

Euryalona colletti (G. O. Sars).

- 1. Adult female, lateral view.
- 1a. Inferior part of head, with adjoining part of valve.
- 1b. Tail-piece.

Pleuroxus inermis, G. O. Sars.

- 2. Adult female, lateral view.
- 2a. Inferior part of head, with adjoining part of carapace.
- 2b. Tail-piece.

Dunhevedia crassa, King.

- 3. Adult female, lateral view.
- 3a. Same, ventral view.
- 3b. Inferior part of head, with adjoining part of valve.
- 3c. Tail-piece.

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